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# CLUSIACEAE

*R.A. Kerrigan, I.D. Cowie & D.J. Dixon*

*Trees*, shrubs, lianas, or herbs, mostly containing a yellow, orange or clear resinous latex; glabrous or with simple or stellate hairs. *Leaves* opposite or whorled, simple and mostly entire; stipules absent. *Inflorescence* terminal or axillary, cymose, racemose, fasciculate or solitary. *Flowers* unisexual or bisexual, actinomorphic. *Bracteoles* often present and grading into sepals. *Sepals* free or connate only at base, usually indistinguishable from petals. *Petals* free or connate at base, usually (2) 3–6 (14), imbricate or convolute. *Stamens* few to many, filaments free or grouped into 2–5 bundles connate at the base; anthers dithecal and at least sometimes bisporangiate, opening by longitudinal slits. *Gynoecium* usually of 1–many carpels, united to form a superior compound ovary with as many carpels as locules or unilocular. *Styles* 1–many, usually as many as carpels, free, connate at base or absent. *Stigma* terminal, lobed or peltate. *Fruit* a berry, drupe or capsule. *Seeds* often with a funicular or micropylar aril.

Following Cronquist (1981) circumscription the Clusiaceae (or Guttiferae) are a family of about 36 genera and 1,600 species with a pantropical distribution. Four genera and 16 species are native to Australia and three genera and five species are found in the N.T.

In recent classifications, as summarised by Mabberley (2008), the families Bonnetiaceae and Hypericaceae are recognised as distinct from the Clusiaceae, and about 30 genera and 1,150 species are recognised within the family.

Members of different genera provide gums, pigments and dyes, edible fruit (*e.g. Garcinia mangostana*, the Mangosteen), drugs (from spp. of *Harungana* and *Hypericum*), oil seeds, timbers (*Calophyllum*) and cultivated ornamentals (*Hypericum*).

Taxonomic references: Bamps *et al.* (1978); Cronquist (1981); Wheeler (1992); Mabberley (2000, 2008); Gustafsson (2004).

- |    |  |                    |
|----|--|--------------------|
| 1  | Trees .....  | 2                  |
| 1: | Herb .....   | <b>Hypericum</b>   |
| 2  | Lateral veins spaced less than 1 mm apart; petiole not stem-clasping ..... | <b>Calophyllum</b> |
| 2: | Lateral veins spaced more than 1 mm apart, petiole stem-clasping .....     | <b>Garcinia</b>    |

## CALOPHYLLUM L.

Evergreen *trees* or shrubs, rarely subshrubs, secreting a yellow latex when cut. *Indumentum* of uniseriate hairs usually at least on buds. *Leaves* decussate in adult plants, rarely alternate in young plants, petiole often with prominent ligulate appendages, lamina with very close parallel prominent venation, often with translucent glandular canals and brownish resin canals. *Inflorescence* terminal or axillary, solitary or in few- or many-flowered paniculate cymes or racemes, usually bisexual. *Tepals* 4–16, greenish-white to yellow, free. *Stamens* numerous, filaments usually only slightly connate at base. *Ovary* unilocular, 1 ovule per locule. *Style* usually present, stigma tending to be somewhat expanded, often peltate. *Fruit* drupe-like, fleshy to fibrous, 1-seeded.

Genus of *c.* 187 species, pantropical but predominantly Indo-Malesian. Six species occur naturally in Australia, with three in the N.T.

Taxonomic references: Backer & Bakhuizen van den Brink (1963); Bamps *et al.* (1978); Stevens (1980); Wheeler (1992); Hyland & Whiffin (1993); Booth *et al.* (2001).

- |    |   |                     |
|----|---|---------------------|
| 1  | Upper midrib raised on most leaf lamina, if depressed extending for less than the bottom third of the lamina; bark yellow .....                     | <b>C. soulattri</b> |
| 1: | Upper midrib depressed on the bottom third of the leaf lamina; bark black (if yellow only at first, then becoming rusty brown, grey or black) ..... | 2                   |

- 2 Fruit at least 3 cm in diam.; most leaves with the lamina less than 2.5 times longer than wide; bark grey-brown to black ..... **C. inophyllum**
- 2: Fruit no more than 2 cm in diam.; most leaves with the lamina more than 2.5 times longer than wide; bark yellow, becoming black ..... **C. sil**

### **C. inophyllum** L.

*Tree* to 20 m, bark deeply fissured, coarse and flaky, grey-brown, brown or black. *Young shoots* and branchlets glabrous or glabrescent and with uniseriate septate hairs; branchlets 4-angled, often with a whitish bloom. *Petioles* channelled above, 13–25 mm, glabrescent. *Lamina* elliptic or obovate to oblanceolate, 6.6–19.4 cm long, 3.6–10.2 cm wide, base obtuse to cuneate, apex obtuse, rounded or emarginate, glossy, glabrous or glabrescent with scattered hairs around midrib on lower surface, midrib on upper surface depressed or channelled throughout. *Inflorescence* axillary, a panicle or raceme of paired flowers, rachis to 157 mm long, pedicel to 35 mm long. *Bracts* caducous, leaving scar on rachis at base of pedicel, obovate, *c.* 4 mm long, 3 mm wide, glabrous. *Tepals* 8–10 (13), white, cream; outer pair orbicular, somewhat hooded *c.* 5.5–10 mm long, *c.* 4.5–8 mm wide; remaining pairs varying in shape and size, elliptic, obovate to oblanceolate, *c.* 9–16 long, *c.* 2–12 mm wide, glabrous. *Stamens* numerous, yellow, connate at base in ring around ovary, often in bundles, to *c.* 10 mm long. *Ovary* *c.* 1.5–3 mm long. *Style* *c.* 2.5–9 mm long. *Stigma* peltate. *Fruit* globular, 3.3–3.7 cm long, 2.5–3 cm diam., spongy, indehiscent, glaucous. *Flowering & fruiting* throughout the year.

#### **Beauty Leaf**

Fig. 1 (Cowie 5428; Brennan, D140849); Pl. 1 (unvouchered).

Eastern Africa to Taiwan, the Ryukyu and Line islands, New Caledonia and Australia (N.T., Qld.). In the N.T. found in scattered coastal areas from Fog Bay to Groote Eylandt. Typically in coastal vine thickets or coastal foreshore on sand or cliffs of laterite or sandstone. Also cultivated as an ornamental tree around Darwin.

According to Hyland & Whiffin (1993) the fruits and leaves are poisonous although Mabberley (2000) indicated that oil from seed is considered to have medicinal properties.

### **C. sil** Lauterb.

*Tree* to 30 m, bark fissured, yellow at first, then becoming grey-brown or black. *Young shoots* and branchlets glabrous or glabrescent and with uniseriate septate hairs; branchlets 4-angled.

*Petioles* channelled above, 4.5–20 mm, glabrescent, often with a whitish bloom. *Lamina* elliptic, oblong to narrowly oblong or lanceolate, rarely oblanceolate, 4–16 cm long, 1.9–6 cm wide, base cuneate, the apex acute, obtuse, acuminate or rarely emarginate, glossy, glabrous or glabrescent with scattered hairs around midrib on upper and lower surface, midrib on upper depressed or channelled throughout, or at least for bottom third. *Inflorescence* axillary, a raceme of paired flowers, rachis to 50 mm long, pedicel to 13 mm long, puberulent. *Bracts* caducous, leaving scar on rachis at base of pedicel, ovate, *c.* 3.5 mm long. *Tepals* 4–6 (13), white, cream; outer pair ovate, orbicular or obovate, somewhat hooded, *c.* 3.5–6 mm long, *c.* 2.5–5 mm wide; remaining pairs spatulate, obovate or widely ovate, *c.* 4.5–7.5 mm long, *c.* 2.5–5 mm wide. *Stamens* numerous, yellow, to *c.* 5 mm long. *Ovary* *c.* 1.3–1.5 mm long. *Style* *c.* 1.5–1.7 mm long. *Stigma* peltate. *Fruit* globular, 1–1.9 cm long, 1–1.5 cm diam., fleshy, indehiscent, blue-black to purple with glaucous bloom. *Flowering & fruiting* throughout the year.

Fig. 1 (Cowie 5726; Must 701).

Southern mainland New Guinea to Australia (W.A., N.T., Qld.). In the N.T. distributed widely across the Top End, from the Fitzmaurice River east to Groote Eylandt. Uncommon in the D.R., occurring at Litchfield N.P., Lee Point and Melville Island. Found in riparian and monsoon vine forest on sand, sandstone or quartzite.

### **C. soulattri** Burm.f.

*Tree* to 20 m, bark with longitudinal fissures or smooth, yellow. *Young shoots* and branchlets glabrous or glabrescent and with uniseriate septate hairs; branchlets 4-angled, often with a whitish bloom. *Petioles* channelled above, 8–30 mm, glabrescent. *Lamina* elliptic or ovate to lanceolate, 9.5–26.2 cm long, 2.6–8.5 cm wide, base obtuse to cuneate, apex acute to obtuse, glabrous or glabrescent with scattered hairs around midrib on upper and lower surface, midrib on upper surface raised throughout. *Inflorescence* axillary, terminal, a panicle of cymes or a raceme of paired flowers, rachis to 32 mm long, pedicel to 30 mm long. *Bracts* caducous, leaving scar on rachis at base of pedicel, triangular, *c.* 3 mm long, 2 mm wide,

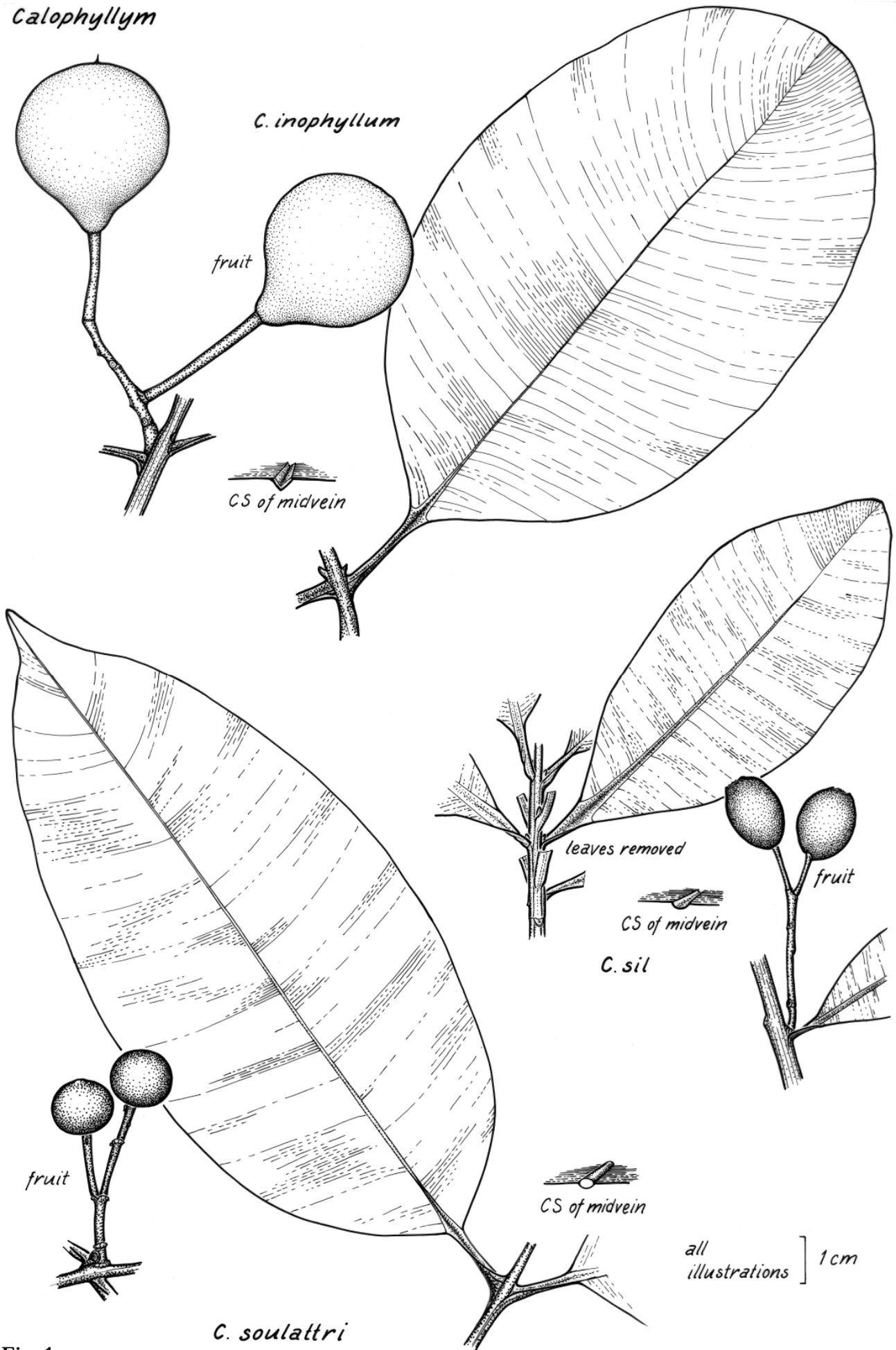


Fig. 1  
FDRV1

tomentose on lower surface. *Tepals* 4, white, cream; outer pair ovate to obovate, somewhat hooded *c.* 4.5–7 mm long, *c.* 3–7.5 mm wide, with ciliate margins; remaining pair obovate, *c.* 5–10 mm long, *c.* 3.2–7 mm wide, glabrous. *Stamens* numerous, yellow, to *c.* 6 mm long. *Ovary* *c.* 1–2 mm long. *Style* *c.* 1.5–2.5 mm long. *Stigma* peltate. *Fruit* globular, 1–1.2 cm long, 1–1.3 cm diam., fleshy, indehiscent, blue-black to purple. *Flowering & fruiting* throughout the year.

Fig. 1 (*Fensham 930; Munns 86*); Pl. 2 (*Pritchard 26*)

Vietnam to Australia (N.T.), the Solomon Islands and Palau Island. In the N.T. distributed widely across the Top End, from the Fitzmaurice River east to Gove Peninsula and including the Tiwi Islands; common in the D.R. Found in riparian and monsoon vine forest on permanent springs and creeks in humic soil, sand or sandy loam.

## GARCINIA L.

*Trees* or shrubs, rarely subshrubs, secreting a yellow latex when cut. *Leaves* opposite or sometimes subopposite or whorled, petiolate, entire, venation usually prominent, often with translucent glandular canals and brownish resin canals; petiole often with prominent ligulate appendages. *Inflorescence* terminal or axillary, solitary or in few- to many-flowered cymes, fascicles, racemes or panicles, bisexual or unisexual, monoecious, dioecious or polygamous. *Sepals* 2–5. *Petals* 4–5 (8) greenish-white to yellow. *Male flowers* varied, mostly composed of 4 (5) fascicles of numerous stamens, each with filaments free or variously fused together, rudimentary ovary sometimes present. *Female and bisexual flowers* often larger than male, with 4 (5) stamen-bundles or staminode-bundles, fused together or free in a ring. *Ovary* globose, 2–12 locules. *Style* usually absent, stigma more or less sessile, lobed or entire. *Fruit* a 1–4-seeded fleshy berry, smooth or verrucose, glabrous or puberulous. *Seeds* with large seeds coated in pulpy tissue (arillode).

Perhaps 12 species of subtropical and tropical countries; four in Australia. *Garcinia mangostana* (Mangosteen), an exotic species, is cultivated in the D.R. for its edible fruit.

Taxonomic references: Mueller (1891); Bamps *et al.* (1978); Hyland & Whiffin (1993).

### **G. warrenii** F. Muell.

*Tree* to 15 m, bark shallowly fissured or scaly, brown to grey-brown. *Young stems* angular. *Exudate* from blaze, stems, leaves and petioles yellow (can be less visible in dry conditions). *Petioles* ligulate at base, partially sheathing stem and acting as functional stipules on new growth. *Leaves* opposite. *Lamina* elliptic to obovate, 7–16 cm long, 3–8 cm wide, base cuneate to obtuse, apex acuminate to obtuse or emarginate. *Inflorescence* terminal, monoecious, male flowers cymose (usually in triads) on a stout peduncle 2 mm wide, female flowers solitary. *Flowers* unisexual, strongly perfumed. *Sepals* 4, white, cream or green, *c.* 3 mm long, inner sepals exceeding the outer. *Petals* 4, broadly spatulate, 9–10.5 mm long, 5.5–6 mm wide, white, cream or yellow. *Male flowers* with

numerous stamens aggregated into four groups, disc absent. *Female flowers* with ovary apparently 2-locular (but partition not fused), vestigial stamens present at base of petals. *Stigma* sessile, capitate. *Fruit* depressed-globular, 40–50 mm long, 50–60 mm wide, red, blue, purple or black, fleshy, indehiscent, calyx lobes persistent. *Seeds* about 32–35 mm long, 23–35 mm wide. *Flowering* only recorded Aug. *Fruiting* not recorded.

Fig. 2 (*Fell 3759, Harwood 907*).

New Guinea and Australia (N.T., Qld). In the N.T. only recorded from one locality on Melville Island where it was growing in monsoon forest adjacent to mangroves. Fruit and timber are utilised in New Guinea.

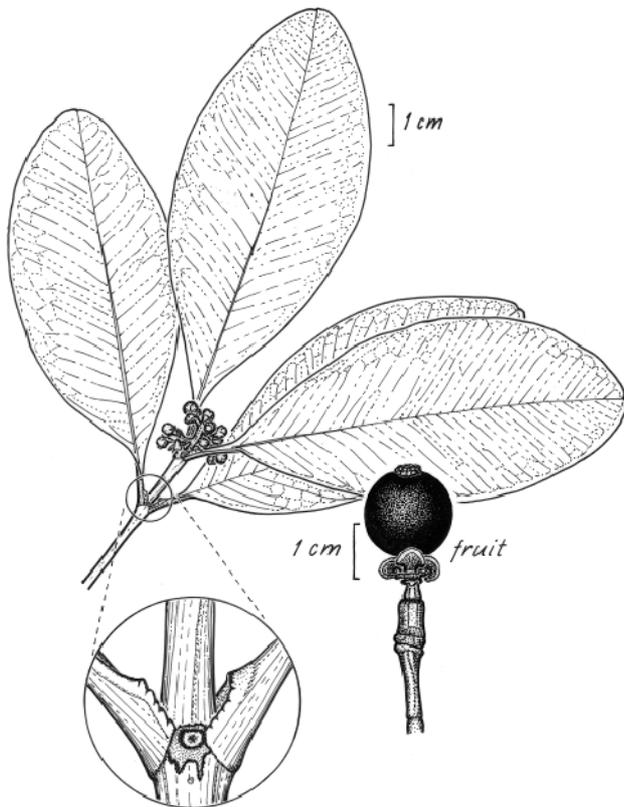
*Garcinia warrenii*

Fig. 2

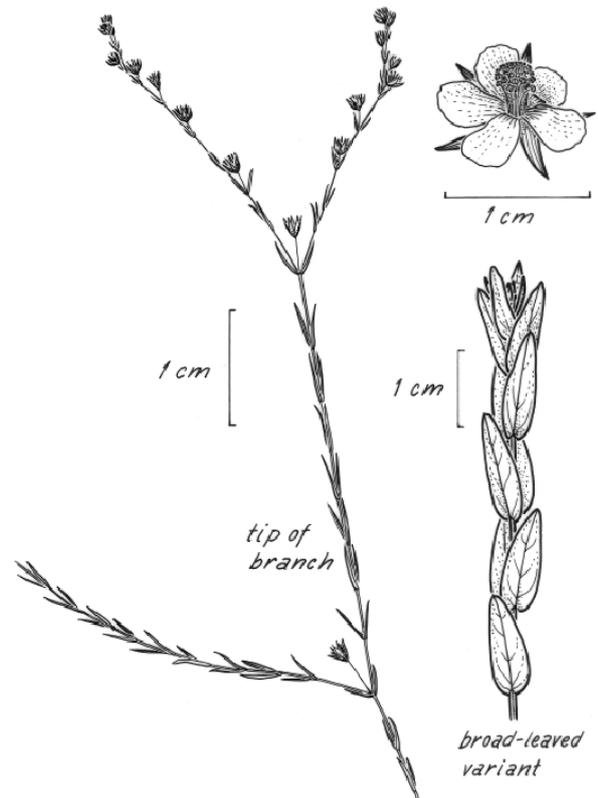
*Hypericum gramineum*

Fig. 3

## HYPERICUM L.

*Shrubs* or herbs, rarely trees. *Leaves* opposite, sessile, not coriaceous, glandular-punctate. *Inflorescence* axillary, solitary or in few- to many-flowered cymes. *Flowers* bisexual, yellow to orange. *Sepals* 4 or 5, often glandular. *Petals* 4 or 5, often glandular, often clawed. *Stamens* numerous, free, filaments filiform, anthers globular, with a minute gland at the apex. *Ovary* globose, 1–3-celled, ovules numerous. *Styles* 3–5, free or connate, stigma more or less sessile, lobed or entire. *Fruit* a septicidal capsule opening by 3 or 4 valves. *Seeds* numerous.

About 400 species, some used medicinally, many cultivated as ornamentals. Two species native to Australia and only *Hypericum gramineum* in the N.T.

Taxonomic reference: Wheeler (1992).

### *H. gramineum* G. Forst.

Annual or perennial *herb*, to 50 cm, sometimes decumbent. Stems 4-angled with 4 longitudinal ribs, sometimes glaucous or red-tinged. *Leaves* opposite and decussate, ovate to obovate, narrowly elliptic to oblanceolate or linear, 15–28 mm long, (0.8) 2–8 mm wide, base caudate to obtuse and stem-clasping, margin mildly to strongly recurved, apex acute to obtuse, upper and lower surface prominently glandular punctate. *Inflorescence* a monochasial or dichasial cyme, appearing as solitary axillary flowers; bracts foliar. *Pedicels* to 11 mm long. *Sepals* 5, imbricate,

lanceolate, narrowly elliptic or oblong, 4–5 mm long, 1.1–1.8 mm wide, glandular punctate. *Petals* 5, obovate, 3.3–5 mm long, 1.7–2.2 mm wide, yellow, orange-yellow or rarely white. *Stamens* numerous, free, *c.* 2.1–3 mm long. *Ovary* 1-celled. *Styles* 3 or 4, *c.* 0.5–1 mm long. *Capsule* ovoid, 3.5–5 mm long, 1.7–3.5 mm diam., sepals persistent. *Seeds* cylindrical, with longitudinal ribs, stramineous, *c.* 0.4–0.5 mm long. *Flowering & fruiting* throughout the year. **Small St John's Wort.**

Fig. 3 (Cowie 8424; Michell 2527); Pl. 3 (Stuckey 669).

South-east Asia, Malesia, Australia (all States), New Guinea, New Caledonia and New Zealand. Widely distributed throughout the N.T., from the southern region to the Top End. The only record for the D.R. is from Berry Springs. Found in moist areas such as drainage flats, swamps,

seasonally inundated woodlands and soaks; typically in sand and clay sands.

Wheeler (1992) reported that *H. gramineum* is suspected of poisoning stock.

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Pl. 1 *Calophyllum inophyllum* (Photos: B.M. Stuckey)



Pl. 2 *Calophyllum soulattri* (Photos: B.M. Stuckey)



Pl. 3 *Hypericum gramineum* (Photo: B.M. Stuckey)